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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/815,116

03/31/2004

Andreas Kirchner

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6567

22876 7590 04/24/2007  
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EXAMINER

GUTIERREZ, KEVIN C

ART UNIT

PAPER NUMBER

2851

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/24/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/815,116		KIRCHNER ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Kevin Gutierrez		2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 February 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 6-33 and 35 is/are pending in the application.
- 4a) Of the above claim(s) 19-32 and 35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-18 and 33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to the amended claims filed February 7, 2007 have been fully considered but they are not persuasive. However, the objections to the claims have been withdrawn.

Regarding the Remarks on page 7, the Applicant states there is no teaching or suggestion in Fujisawa that tilting the wafer could also be used to correct distortion. The Examiner respectfully disagrees. See Figure 4A-4c, [0088], lines 1-7, where the wafer is tilted based on the correction provided by the arithmetic circuit mechanism (114) to correct distortion ([0085], lines 2-5). For the at least reasons state above, the combined teachings of Van Der Werf et al. and Fujisawa et al. disclose the claimed invention.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4, 6-7, 9-10, 13-18 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Der Werf et al. (US 2003/0003383) in view of Fujisawa et al (US 2003/0090640).

Regarding claims 1 and 6-7, Van Der Werf et al disclose (a) “providing a microlithographic projection exposure apparatus (shown in Figure 1) comprising a projection lens (fig. 1, PL) that is non-telecentric on an object side ([0018]) and having an extra-field region of an image plane (W), wherein the microlithographic projection exposure apparatus is configured to image a pattern ([0017], contained in a reticle (MA; mask) on a substrate (W; wafer) of a light-sensitive layer while the reticle (MA; mask) is traversed relative to the projection lens (PL) along a scan direction at a first relative velocity ([0017], lines 5-13),

(b) establishing a substantially linear distortion with twofold symmetry in the extra-axial field region of an image plane of the projection lens ([0066], lines 1-5),

(c) tilting the reticle (MA; mask) for the correction of the distortion established in step b) about a tilt axis that is disposed at least approximately perpendicular to an optical axis of the projection lens (PL) and to the scan direction ([0017], lines 9-13; [0066], lines 13-20).”

Van Der Werf et al disclose where the reticle can be tilted about an axis and where the position of the wafer is displaceable. Van Der Werf et al. does not disclose (d) “tilting the wafer for correction of the distortion established in step b) about a further tilt axis that extends parallel to the tilt axis about which the reticle is tilted,” (claim 6) “wherein the reticle and the wafer are tilted about tilt angles, the ratio of which is, in terms of magnitude, substantially equal to the linear magnification of the projection lens;” and (claim 7) “wherein the tilt axes about which the reticle and the

wafer are tilted have spacings from the optical axis, the ratio of which is, in terms of magnitude, substantially equal to the linear magnification of the projection lens.”

However, Fujisawa et al. teach having the axes and tilt of the reticle and wafer in a way as aforementioned above ([0064], lines 13-16, where the change of tilt angle of the wafer is performed by the driving mechanism 111. See Figure 4A-4c, [0088], lines 1-7, where the wafer is tilted based on the correction provided by the arithmetic circuit mechanism (114) to correct distortion ([0085], lines 2-5 ). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the wafer stage of Van Der Werf et al by having it being tilted by the driving mechanism as taught by Fujisawa for at least the purpose of performing an aberration correction.

Regarding claim 2, Van Der Werf et al. further disclose “wherein a wafer is traversed along the scan direction relative to the projection lens at a second relative velocity ([0033]), the ratio of the first traversing velocity to the second traversing velocity being predetermined by the linear magnification of the projection lens ([0056], lines 12-14).”

Regarding claims 3 and 4, Van Der Werf et al. further disclose wherein the tilt axis extends through “a region” and “the middle of the region” of the reticle that is exposed to projection light ([0058], lines 7-10).”

Regarding claims 9-10 and 13, Van Der Werf et al. disclose all of the claimed limitations except “wherein additionally at least one optical element of the projection lens is changed in its spatial position.”

However, having at least one optical element of the projection lens is changed in its spatial position parallel to the optical axis and perpendicular to the scanning direction is known to the art as it is evident by the teaching of Fujisawa et al ([0066], lines 2-4, a lens control unit control a driving element to drive the lens elements in a direction in the optical axis). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the projection lens of Der Werf et al by including a driving element to control change the spatial position of the projection lens for at least the purpose of performing an aberration correction.

Regarding claims 14-15, Van Der Werf et al. disclose all of the claimed limitations except (claim 14) "wherein the at least one optical element is tilted about a tilt axis that is disposed at least approximately perpendicular to the optical axis of the projection lens and to the scan direction" and (claim 15) "wherein the at least one optical element is tilted about a tilt axis that is disposed at least approximately perpendicular to the optical axis of the projection lens and parallel to the scan direction."

However, wherein the at least one optical element is tilted about a tilt axis that is disposed at least approximately perpendicular to the optical axis of the projection lens and at least perpendicular to the scan direction or parallel to the scan direction is known to the art as it is evident by the teaching of Fujisawa et al ([0066], lines 63-66). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the projection lens of Van Der Werf et al by including a driving element to perform a tilt in a manner described above for at

least the purpose to as aforementioned above for at least the purpose of adjusting an aberration.

Regarding claim 16, Van Der Werf et al. further disclose “wherein additionally the linear magnification of the projection lens is changed ([0044], lines 6-9).”

Regarding claims 17 and 18, Van Der Werf et al. further disclose wherein the projection lens exclusively has mirrors as imaging components and wherein the projection lens has at least four mirrors ([0011]).

Regarding claim 33, Van Der Werf et al. disclose the limitations set forth in claim 1 and further disclose “a) providing a substrate onto which a layer of a light-sensitive material is applied at least partially ([0010], lines 3-4);

- b) providing a reticle that contains structures to be imaged ([0004], line 9);
- c) providing a projection exposure apparatus with a projection lens ([0011], lines 5-6);
- d) correction of a distortion of the projection lens in accordance with the method as specified in claim 1 ([0066], lines 1-5);
- e) projecting at least a part of the reticle onto a region on the layer with the aid of the projection exposure apparatus ([0004], lines 4-6).”

4. Claims 8 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Der Werf et al. and Fujisawa et al., as applied to claim 1 above, and in further view of Suzuki (5,796,467). The teachings of Van Der Werf et al. and Fujisawa et al. have been discussed above.

Regarding claim 8, Van Der Werf et al. as modified disclose a moveable substrate, but does not disclose “wherein the substrate is displaced in the image plane for the correction of a field-constant portion of the distortion.”

However, having a substrate displaced in the image plane for the correction of a field-constant portion of the distortion is known to the art as it is evident by the teaching of Suzuki (col. 1, lines 47-49 and lines 58-61). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the substrate table of Van Der Werf et al. as modified by having the substrate displaced in the image plane for at least the purpose to obtain a less distorted image.

Regarding claims 11-12, Van Der Werf et al, as modified, disclose all of the claimed limitations except “wherein the at least one optical element is displaced translationally in a plane perpendicular to the optical axis.”

However, having at least one optical element displaced in a plane perpendicular to the optical axis and in the scan direction is known to the art as it is evident by the teaching of Suzuki (col. 7, lines 63-66). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the projection lens of Van Der Werf et al by including means to drive an optical element of the projection lens for at least the purpose to incline the imaging plane.



***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Gutierrez whose telephone number is (571)-272-5922. The examiner can normally be reached on Monday-Friday: 8:00 a.m. - 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571)-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin Gutierrez  
Examiner  
Art Unit 2851

April 16, 2007



**DIANE LEE**  
**SUPERVISORY PATENT EXAMINER**